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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,557	02/23/2004	Benjamin A. Bard	114-56	8668
2746	7590	09/23/2004	EXAMINER	
WILLIAM H. EILBERG THREE BALA PLAZA SUITE 501 WEST BALA CYNWYD, PA 19004			TURNER, SAMUEL A	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 09/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/784,557

Applicant(s)

BARD ET AL.

Examiner

Samuel A. Turner

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 26-58 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 26-58 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/23/04.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 26-28, 32-34, 37, and 41-43 are rejected under 35 U.S.C. ' 102(b) as being clearly anticipated by Nakadate et al (Applied Optics-7/1985).

With regard to claims 26-28, 32-34, and 37 Nakadate et al teach capturing a plurality of images S_{i0} ($i=1-3$) that are stored in memory, meeting the limitations (a)-(c) in claims 26-28 and (a) in claim 37; after deformation obtaining a plurality of images S_{ij} ($i=1-3, j=1-4$) that are stored in memory, meeting the limitations of (d)-(e) in claims 26 and (b) in claim 37; the phase differences are calculated Θ_i ($i=1-3$) meeting the limitation (f) in claim 26; and displaying the interferogram on the display, meeting the limitation (g) in claim 26 and (c) in claim 37.

With regard to claims 32-34 figure 17 shows a Michelson type shearing camera wherein the PZT is driven through phase differences of $0, \pi/2, \pi$, and $3\pi/2$. With regard to claims 41-43 Nakadate et al teach an apparatus for fringe scanning speckle-pattern shearing interferometry comprising illumination lasers, a shearing camera which meets limitation (a) of claim 41, a TV camera, digital frame memory, computer which meets limitation (b) of claim 41, and monitor which meets

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limitation (c) of claims 41-43. See figure 16. The shearing camera is a Michelson interferometer having a PZT driven by the computer attached to one of the interferometer mirrors. See figure 17.

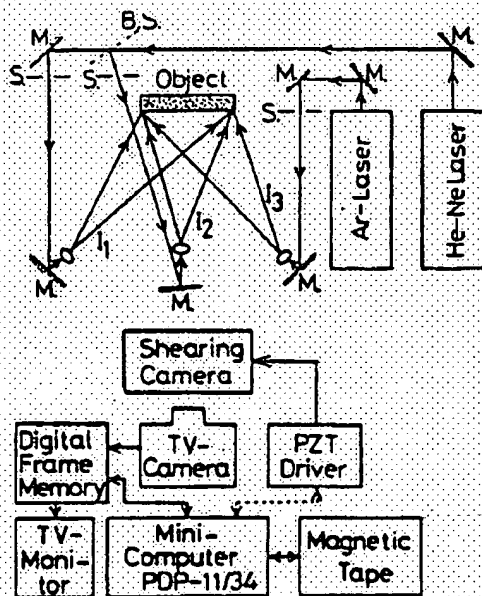


Fig. 16. Schematic diagram of fringe scanning speckle-pattern shearing interferometry for 3-D deformation measurement.

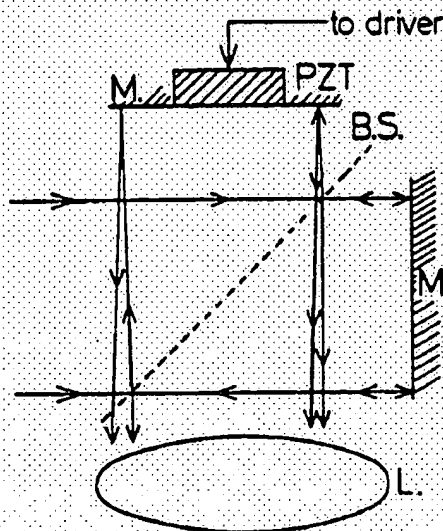


Fig. 17. Shearing camera for fringe scanning speckle-pattern shearing interferometry.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 29, and 35 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakadate et al(Applied Optics-7/1985).

Nakadate et al teach a four sample equation(1) for finding the optical phase difference Φ , see page 2173. Not taught is the eight sample equation as claimed.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the four sample equation of Nakadate into the eight sample equation claimed in claim 29 as a mere mathematical expansion of the same four sample equation.

Claims 30, 31, 36, 40, 47, and 55 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakadate et al(Applied Optics-7/1985) as applied to claims 29, and 35 above, and further in view of Toh et al(Mechanical Engineering-2/1999).

Toh et al teach using a digital speckle-shearing interferometer comprising a Michelson interferometer with a PZT driven mirror, a CCD camera, and a computer for image processing. Toh uses a four image method with phase differences at 0, $2\pi/3$, and $4\pi/3$. Because the fringe patterns are noisy Toh teaches using a smoothing operation.

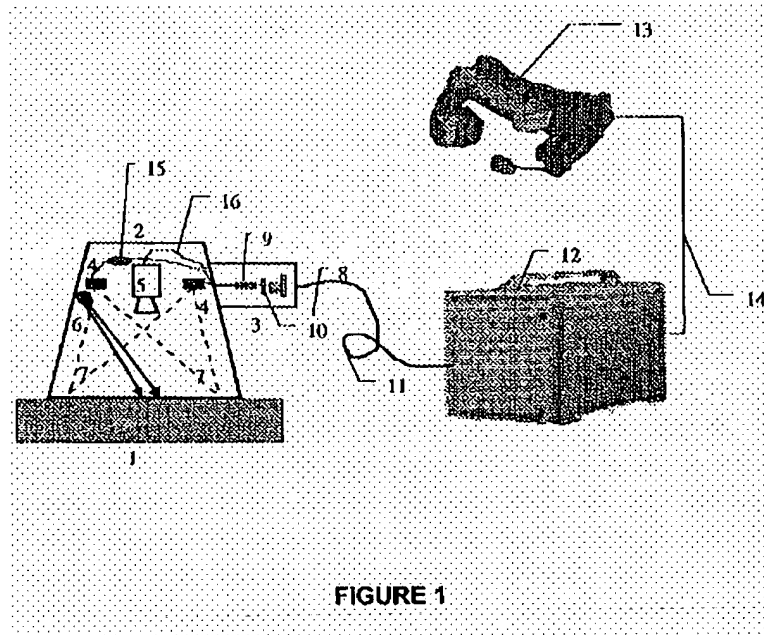
It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Nakadate method and apparatus by using look-up tables to determine the optical phases to decrease the processing time as this is a well known technique to reduce processing time. Further, the application of a smoothing technique to the images in order to reduce noise is taught by Toh and thus would have been a obvious modification to the Nakadate processing method. Finally, while Nakadate uses a TV camera, it would have been obvious to the skilled artisan to replace the TV camera with a high-resolution CCD camera as taught by Toh to provide a high accuracy measurement system.

Claims 44-46, 48-54, and 56-58 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakadate et al(Applied Optics-7/1985) and Toh et al(Mechanical Engineering-2/1999 as applied to claims 29, 30, 31, 35, 36, 40, 47, and 55 above, and further in view of Chen(6,043,870).

Chen teaches a compact speckle pattern interferometer comprising a housing(2), shearing camera(5), excitation means(6), computer(12), and display(13).

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See figure 1. Various excitation means are disclosed and a plurality can be used together. See column 4, lines 29-47.



It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Nakadate apparatus by placing the apparatus in a housing along with one or more excitation means, as taught by Chen, to provide a portable device for field applications.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel A. Turner whose phone number is **571-272-2432**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached on **571-272-2800 ext. 77**.

The fax phone number for the organization where this application or proceeding is assigned is **703-872-9306**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see **<http://pair-direct.uspto.gov>**. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at **866-217-9197** (toll-free).



Samuel A. Turner
Primary Examiner
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